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ABSTRACT

This document describes an interactive television (ITV) distance education network designed to service rural schools. Phase one of the network involved the installation of over 14 miles of fiber optic cable linking two high schools, a career center, and the University of Rio Grande; phase two will bring seven high schools in economically depressed communities online with ITV capabilities. The scope of the project and management strategies are discussed, and ITV educational goals are listed. An outline of transmission technologies for distance education and a project task chart conclude the paper. (DB)

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LINKING CLASSROOMS OF THE FUTURE

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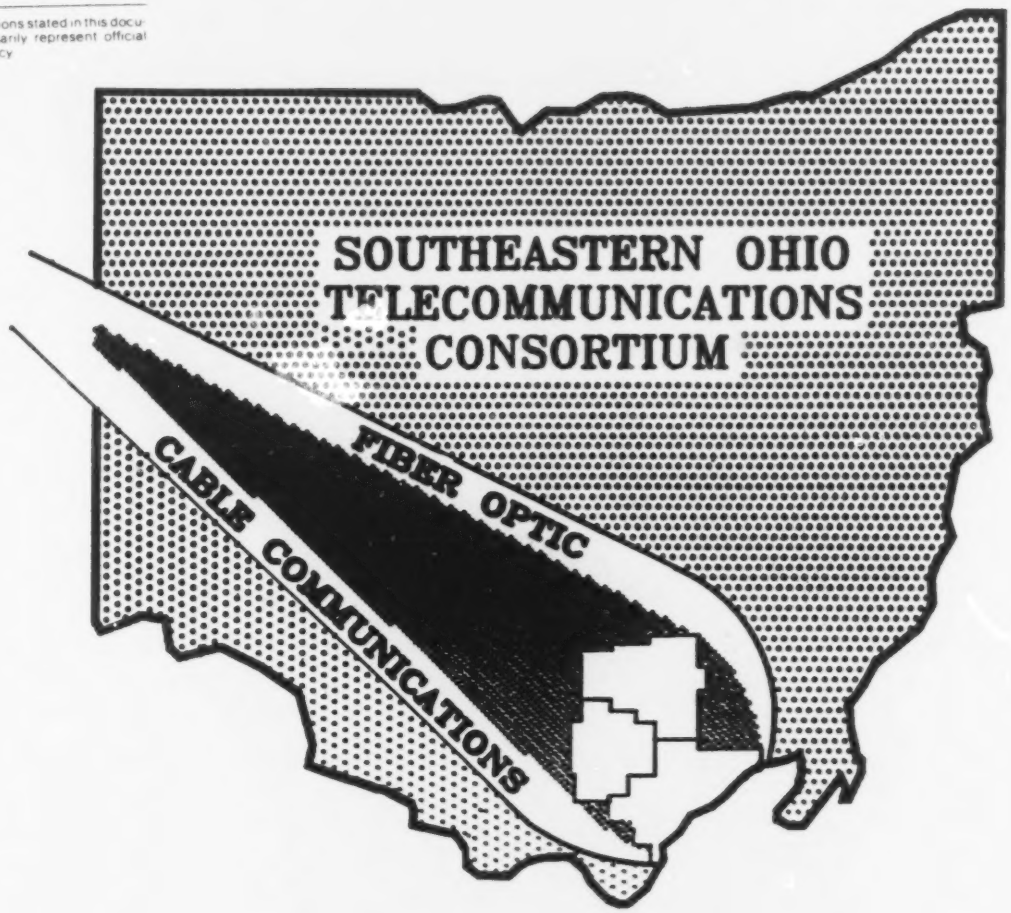

THROUGH INTERACTIVE TELECOMMUNICATIONS NETWORK

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SOUTHEASTERN OHIO TELECOMMUNICATIONS CONSORTIUM

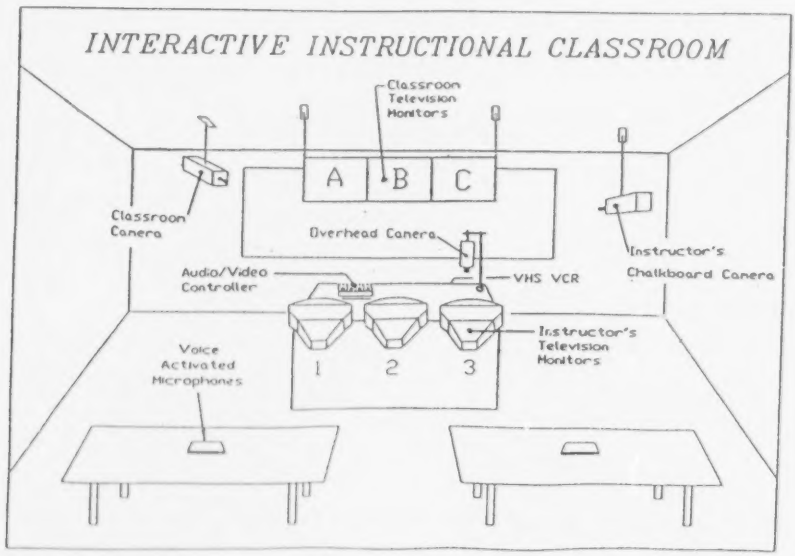
The Southeastern Ohio Telecommunications Consortium, (SEOTC), is a cooperative effort of school districts and universities in the southern Ohio counties of Gallia-Jackson and Vinton. At the present time this tri-county consortium is comprised of seven rural appalachia local school districts and the University of Rio Grande. SEOTC was formed January 18, 1990 as an organized board to manage an interactive distance learning telecommunications network.

SEOTC Membership

Gallia County Local Schools
Gallia-Jackson-Vinton JVSD
Gallipolis City Schools
Jackson City Schools
Oak Hill Union Local Schools
Wellston City School
Vinton County Schools
University of Rio Grande
Ohio Department of Education
(ex. official member)

INTERACTIVE (TWO-WAY) TELECOMMUNICATIONS NETWORK

Distance learning is defined as the transmission of instruction from an origination site to students located in one or more remote sites. The means of transmission can be microwave, optical fiber, coaxial cable, or a combination of these technologies. Instruction is considered interactive if there exists two-way audio and two-way video transmission linking the remote sites with the instructor. At the present time SEOTC is using a fiber optics cable system, which will expand to the use of microwave hardware for future linkage.



Funding for the project was made through the (ARC) Appalachia Regional Commission and the local school districts. An ARC Grant of $400,000 including a local match of $100,000 was secured for the first phase.

MISSION OF SEOTC

The geographical area of Gallia, Jackson and Vinton counties encompass over 1400 square miles of non-industrialized, economically depressed rural communities. Declining school enrollments and limited financial resources have forced school districts to limit academic programming. For this reason, the Southeastern Ohio Telecommunications Consortium has implemented an Interactive Television (ITV) distance learning network to achieve the following goals:

- Provide interactive television instruction by which students can participate in course offerings otherwise not available to them.
- Improve the utilization of existing faculty and facilities within in the school districts.
- Increase basic educational skill levels and reduce dropout rates among secondary students
- Provide specialized instruction to post-secondary students in the areas of college level curriculum, business/industry training programs, work force literacy programs and community based educational outreach programs.
- Expand the Adult Services support programs through ITV which include Adult Basic Education, Job Seeking/Job Keeping, Career Exploration and other adult resource programs.

SEOTC PROJECTS

Phase I

During the spring of 1990 over 14 miles of fiber optic cable was installed linking two rural Gallia County schools, Buckeye Hills Career Center and the University of Rio Grande, the two rural high schools are at the present time transmitting two academic subjects and during the winter/spring quarters the Career Center and the University will begin transmission of planed subject(s) matter.

Phase II

This phase, which will begin in 1991, will additionally bring seven high schools on-line with ITV capabilities. With phase II complete an estimated 4,600 students can be served by the Interactive network. It is also planned to provide telecommunication linkage to Ohio University in Athens, Ohio during this phase.

SCOPE OF ITV PROJECT

Careful planning and input from all areas of the educational sector as well as the technical industry has been the mainstay of the ITV project. The project director has implemented the following strategies which guide the ITV process.

- Curriculum Committee selections and planning meetings
- Master Teacher Selections
- Inservice of Master Teachers to ITV
- Adaptation of curriculum selections to ITV
- Development of teaching materials, methods, and techniques
- Implementation of the instruction on ITV
- Continuous monitoring of instruction process
- Status review meetings with the curriculum committee
- Evaluation process (By instructors and students)

During the present transmission of curriculum very few problems have developed with either equipment or student issues. The continuous monitoring process and evaluation methods used will provide usable data to make adjustments within the scope of the project.

LINKING-UP: CLASSROOM OF THE FUTURE

Interactive telecommunications can be viewed as an instrument to provide equal educational opportunities to students in many school districts throughout the United States. As stated earlier, economic conditions and declining enrollments have forced school districts to limit curricular offerings. ITV is an efficient and effective method to facilitate academic and vocational programming.

The boundaries of ITV seem to be only limited by the placement of the telecommunications equipment. There are some limits to curriculum offerings, but the overwhelming majority of classroom subject matter can be delivered via ITV. The possibilities of using ITV as an educational delivery system would appear to be endless. The application to the business/industry sector create even greater opportunities for its use.

Providing advanced mathematics, foreign languages or even linking a classroom in-service from Detroit on the latest automotive maintenance procedures are no longer an impossibility.

The educational incentives have been the catalyst for school districts to seek ITV technology. Expanded applications within a telecommunications network suggest even broader usage in some of the following areas:

- Common data systems
  4800 BAUD
  9600 BAUD
  19.2 KB per second
- PBX System (telephone)
- FAX
- Commmon Security Systems
- Satellite Down Link (Both C & KU Band)
- Leasing of Excess Fiber Lines
- District Cable Systems
- Linkage Into Distant Cable Systems
- Training in the Technology of Fiber Optics
- Computer Aided Drafting System Linkage

Table 3-1—Transmission Technologies for Learning at a Distance

Technology[a]	Configuration	Advantages	Disadvantages	Trends
Terrestrial broadcast	One-way broadcast of audio, video, and possibly data; possible audio return	No special receiving equipment or converters; reaches most schools and homes	Limited channels and air time; reception limited by geography; high transmission equipment and production costs	Increased use of data/text transmission
Fiber optic	Two-way audio, data, and video	High capacity/speed; channel capacity easily expandable; high-quality signal	High installation cost; rights-of-way may be required to lay new cable	Costs are declining rapidly; fiber deployment is expanding rapidly
Microwave	Two-way point-to-point audio, data, and video	Low-cost transmission time; no rights-of-way needed	Must be FCC-licensed; tower space or location may be difficult to get; difficult and costly to expand channels; crowded frequencies; line of sight required	Use of higher frequencies is expanding
Instructional Television Fixed Service (ITFS)	One-way broadcast or point-to-point audio, data, and video; possibility of audio return	Low-cost delivery of video	Crowded frequencies, especially in cities; FCC licensing required; limited transmission range; line of sight required	Digitalization may triple channel capacity; wider coverage areas using repeaters; rebroadcast of satellite-delivered programming
Public Switched Telephone Network (PSTN)	Two-way voice; limited data and video	Wide coverage; low initial cost; high quality and capacity of fiber optic links; others handle repair and upgrades	Quality is spotty; limited transmission of data and video; cost is distance-sensitive	Expanding fiber installation; digitization of network increasing; increasing intelligence in the network
Satellite	One-way broadcast of voice, data, and video; possibility of audio and data return	Wide coverage transmission cost is distance insensitive	Expensive uplinks; high transmission costs; FCC licensing of uplinks; receive site microwave interference (C-band) or rain fade (Ku-band)	More use of Ku-band; possible transponder shortage; increased use of data; increased interactive capabilities
Audiographics	Two-way computer conferencing with audio interaction	Low cost; easy exchange of graphics; uses PSTN	Visual interaction limited to graphics/still video	More powerful computers; better software and peripherals increase capabilities
Cable television systems	One-way broadcast or two-way point-to-point audio, data, and video	Wide availability; low delivery costs	Limited capacity; can be difficult to interconnect; not usually designed for interactivity	Capacity increases using fiber; more addressability and two-way capability

[a]Technology systems do not have to operate independently; they are often combined in "hybrid" systems.

SOURCE: Office of Technology Assessment, 1989.

INTERACTIVE TELEVISION INSTRUCTION

"At Risk" Grant Objective #4

I — CURRICULUM COMMITTEE

1. Select Members (Nov.1-27)
2. Establish "At Risk" criteria (Dec.6, 90)
3. Identify Courses
   - A) Bilaterial (Aug.28, 90)
   - B) Tri-Laterial (Dec.6, 90)
4. Identify ITV Educator Charac. (Dec.13, 90)
5. ITV Educator selection Process
   - A) Initiate application process (Jan.3, 91)
   - B) Award teachers contracts (Feb.26, 91)
   - C) CEU credit
6. Student Incentives
   - A. Social Interaction (May 31, 91)
   - B. Course Credit
7. Identify ITV Specialists (Nov.27, 91)
8. Inservice ITV Educators (March4, 91)
9. Evaluation of Total ITV Delivery Process by the Curriculum Committee (Dec.20, 91)

Dec.12, 90

II — BI-LATERAL DELIVERY

SPANISH
ANATOMY
(HUMAN PHYSIOLOGY)
TWO SEMESTER DELIVERY

1. Adapt Curriculum to ITV process (Sept.4)
2. Identify "At Risk" (Sept.4)
3. Implementation of unavailable subjects to on line schools (Sept.5)
4. Implimentation of curriculum for Carnigie High School credits (Sept.5-May31)
5. Continuous monitoring of core segment instruction (i.e. equipment, student problems, etc.)(Sept.5-May31)
6. Evaluation (by instructors and students)(May31)

III — ITV EDUCATORS

IDENTIFIED BY CURRICULUM COMMITTEE PROCESS AS OUTLINED IN I 4 (A-B)

1. Inservice to equipment and concept of ITV (March4)
2. Identify "At Risk" (March18)
3. Identify pilot curriculum (March18)
4. Develop teaching materials, methods, and techniques (April18)
   - A) Secondary
   - B) Post Secondary
5. Adapt pilot curriculum to ITV instruction process (April18)
6. Initiate pilot instruction (April22)
7. Future curricular projects (Sept,'90)
7. Evaluation (by instructors and students) (May31)

IV — TRI-LATERAL DELIVERY

PILOT SEMESTER
STUDY SKILLS

1. Inservice using tri-lateral delivery (Dec.10)
   (equipment test)
   A) Develop inservice materials)
2. Identify "At Risk" (Jan.7)
3. Adapt curriculum to ITV process (Jan7)
4. Develop teaching materials, methods, and techniques (Jan.14)
5. Implement instruction (Jan.22)
6. Monitor instruction process ie. equipment (Jan.22)
7. Status review with curriculum committee (Jan.22)
8. Evaluation (by instructors and students) (May.31)

FINAL EVALUATION

Objective #4

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